"WRITTEN SO YOU CAN UNDERSTAND IT."

POPULAR MECHANICS

An Illustrated Weekly Review of the Mechanical Press of the World

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Six Hundred Feet This Monster Dragon Long

Within, Three Hundred Men to Carry Him, Belong--He Writhes, Spits Fire, Is Fierce in Every Way--and is the Chief Essential for a Chinese New Year's Day

CHINESE DRAGON, RELIGIOUS FESTIVAL, CHINESE NEW YEAR, SAN FRANCISCO, CAL.

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Cannon to Prevent Thunderstorms.

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WONDERFUL INVENTIVE GENIUS OF THE CHINESE.

Their Skill Has Helped to Enlighten All the World Except China Itself.

With the mechanical and inventive genius often displayed by Chinese, especially on festive occasions, it is somewhat remarkable that their nation has made so little progress and is so far behind in modern improvements. To the Chinese we are indebted for the discovery of gunpowder and the invention of firearms, yet China is the most defenseless nation in the world. China and not Italy, as told in the Popular Mechanics of Feb. 8, gave to the world the compass, the greatest boon to the sailor, yet China has the poorest sailors of any nation. Printing was common in China long before it was known to the outer world, yet the Chinese are furthest behind in this art, there being less printing done in China today and fewer publications read by Chinese than by any other nationality. A hundred other inventions and discoveries that had their origin in China might be mentioned. They have served to enlighten all the rest of the world except the Chinese. Their civilization is the oldest in existence and yet they are the furthest behind in civilization. In the firecracker every child is given an example of Chinese inventive genius. Table wares and vases, silks, laces and other fine fabrics of China antedates those of any of our most civilized nations.

CHINESE GARDENER'S HOVEL.

VEGETABLE SELLER.

One need go no further than San Francisco to obtain an idea of this same genius inherent in the Chinese. The Railroad Trainmen's Journal has furnished us with interesting illustrations of the Chinaman's mode of life in that city. There on the Chinese New Year they exhibited a mechanical dragon that caused all the other nationalities represented in San Francisco to look on in amazement. More gorgeous than anything of the kind ever exhibited at the New Orleans Mardi Gras or on any other festive event in America or in Europe, the brilliant artificial fiery serpent of interchangeable hue, blocks in length, borne on the shoulders of gaily bedecked Chinamen, was borne through the motley streets of Chinatown. An idea of the appearance of this wonderful dragon may be obtained from our illustration on the title page.

These dragons are from 300 to 600 feet long, the backs made of polished metal which overlap each other, and the sides of ornamental silk. A well developed dragon costs anywhere from $3,000 to $5,000. It is carried by Chinamen who walk inside the beast, their feet only being exposed. Several leaders walk beside the head and with great tridents go through all the motions of keeping the dragon in the middle of the street in spite of his constant attempts to get to one side or the other.

Yet with their ability to get up such magnificent conceptions the Chinese home in San Francisco is quite devoid of the picturesque. They live in most miserable hovels, such as is shown in our illustration of the Chinese gardner's home. His daily avocation is pursued with equipment of the most mediaeval type, as may be seen from the picture of the Chinese peddler. He spends much of his time reclining on a dirty couch in a dingy room smoking his opium pipe. It has been said that the Chinaman has a larger brain than a person of any other nation, and men have declared that if China would once wake up and develop her latent strength she could defy the combined forces of all the other nations of the world.

SMOKING OPIUM.

COAL GREATLY IMPAIRED BY EXPOSURE.

That coal loses much of its combustible power from exposure is a fact well known to several railroads and manufactories, but which is not realized by most of them. It is impaired in quality by certain chemical changes as well as by the moisture it absorbs. Harlan J. German, Wymore, Neb., in the Railway Age says:

"Good coal is made bad and bad coal worse by exposure to all kinds of winter weather. The lower the percentage of fixed carbon that coal contains, the more moisture it can absorb. Bituminous coal obtained from Western mines, having 45 per cent of fixed carbon, under ordinary conditions, contains from 6 to 12 per cent of moisture. Tests of weathered coals shows that by exposure this amount may be increased 50 per cent. Thus coal which originally contained 12 per cent of moisture may, when exposed to the weather by improper storing, contain 18 per cent of moisture. This means that about one-sixth of the weight of the coal, or 350 pounds in each ton, is water, which must be evaporated from the coal after placing it in the firebox of the engine before combustion can take place. Under ordinary conditions, with average bituminous coal containing 45 per cent of fixed carbon, water requires about 12 per cent of its weight in coal for evaporation at 212 degrees. It would, therefore, require about 42 pounds of coal to evaporate the moisture alone contained in one ton of coal, of which the percentage of moisture is 18 per cent. This means that over 2 per cent of such coal as is improperly cared for is consumed in evaporating its own moisture. Then there is the cooling of the heated gases of combustion, caused by so much moisture, the loss of time in heating, to say nothing of the effect of the chemical changes that the coal has undergone during its long exposure.

Mrs. Carrie Nation received a hatchet as a present from an eastern firm. She accidentally dropped it, cutting off the big toe of her right foot. Although she smashed a joint, some of her enemies will say that Mrs. Nation took a drop too much, and that it has injured her standing.

GREAT LAKES BEING DRAINED OF THEIR FISH.

Since the opening of the Chicago Sanitary canal, when the Chicago river was made to reverse its course and become an outlet of Lake Michigan, the Illinois river, into which the canal empties, has become stocked with fish as it never was before. Fish from the lake that formerly could make their way no further westward than Lake Michigan's western bank are now drawn into the Chicago river by the river current and carried in wholesale quantities down the stream into the Illinois and Mississippi rivers. They are hurled over the bear-trap dam at Lockport, after which there is no possible way of their ever getting back to the lake again. Many lake fishermen have expressed the fear that this continual drain on the Great Lakes' fish supply will eventually depopulate them of their finny tribe. The accompanying illustration shows how fish are now being caught in huge quantities along the Illinois river. In the single haul of the net, photographed for this cut, nine tons of fish were caught. The net is the largest ever operated on the Illinois river, being one mile in length and 26 feet deep. The net was made by the Chicago Net and Twine Co., 79 East Indiana street, the official supply house of the Illinois Fishermen's Association. The United States fish law provides that fish-ways shall be constructed on either side of such dams to permit the fish to swim back up stream, but so far the law has been disregarded by the Sanitary canal trustees.

HAULING NET 5,300 FEET LONG.—RESULT, 9 TONS OF FISH.

Emperor Menelik of Abysinia is building telephone lines between his capitol and the Italian settlement in Erythrea. Italy furnishes the wire and Meñelik the poles, and any one caught cutting wires will have his right hand cut off and his property confiscated to pay for the damage.

The Myers Transportation company of Pittsburg, Pa., has been incorporated to build, operate and equip airships and to engage in business of transporting passengers through the air. The authorized capital stock is $100,000.

Easy Electrical Experiments

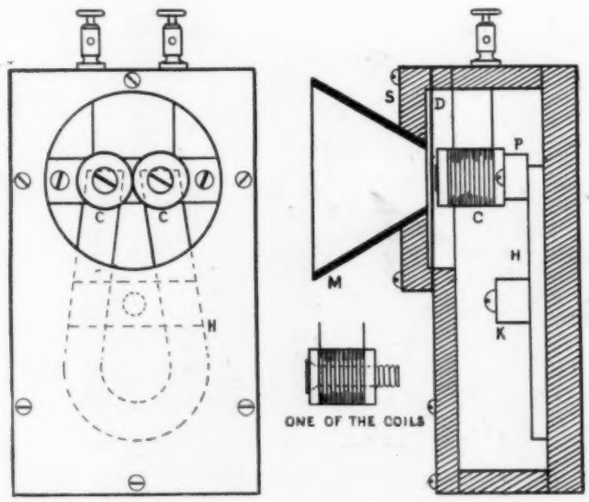
FOR BOYS.

HOW TO MAKE A SIMPLE TELEPHONE.

CHAPTER XII.

A telephone is a source of never failing pleasure to one fond of experimenting. Oftentimes, too, a telephone is of great convenience in affording easy communication between two widely separated points. The instrument is exceedingly sensitive, even when rudely constructed, and so simple that nearly every boy should be able to make one.

There are three things that must enter into the construction of a telephone. These are (1) a permanent steel magnet; (2) a coil or coils wound upon the poles of the magnet, and (3) a diaphragm of very thin soft iron held firmly by the edges so as to vibrate back and forth very close to the poles. These three things are shown in the sketch below, when H is the magnet, in this case of the horseshoe form, and C represents the coils wound upon two iron screws as cores, and D is a circular diaphragm of soft iron. To the above mentioned parts, essential to any telephone, we might add a fourth, namely, a mouthpiece shown at M, whose purpose is to concentrate any sounds uttered near the telephone upon the diaphragm.



FRONT VIEW MOUTHPIECE REMOVED

VERTICAL SECTION THROUGH CASE

In the construction of such a telephone, first make a shallow wooden box, 4¼ inches in length, 2¼ inches in width and 1 inch deep, all measurements taken inside the box. The bottom of the box should be of ⅜-inch whitewood, the sides of ¼-inch wood. Fasten the box tightly together with glue and brads. Make a cover for the box, ¼-inch thick, and at one end cut out a hole 2 inches in diameter. This hole should be midway between the long edges of the cover and its outer edge should be ¼ inch from one end of the cover.

The magnet used is a 3-inch horseshoe magnet, which can easily be purchased at a hardware or electrical store for fifteen cents. It is clamped to the bottom of the box just constructed by a wooden cleat shown at K, held by a screw at its center. The ends of the magnet should project a little above a line drawn through the center of the hole in the cover.

The two coils are wound upon cores formed from two iron machine screws. The size used is what is known as No. 10, and they are about 3-16 inches in diameter by 1 inch in length, and with flat heads. They can be purchased at a hardware store. The screws should be covered with a layer of stout paper, glued on, and then two circular wooden discs are slipped on each screw, whose outside diameter is ⅝ inch. They are for the purpose of forming heads for the coils of wire to be wound upon the core. They should be ⅛ inch thick and should fit tightly upon the screw. Make a hole in a block of wood of such a size that the screw will fit tightly in the holes. Screw it into the block until it projects ¾ inch from the block. The block simply serves as a handle by which to hold the coils while winding and will be thrown away after it has served its purpose. Place the wooden heads in position upon the screw, and place them at such a distance apart that there is a clear space of ½ inch between them. Wind this space full of No. 36 double silk covered magnet wire. Remove the coil from the block which has served for a handle, and there should now be a coil whose outside diameter is ⅝ inch, and whose extreme length is ¾ inches with an iron core made of a screw which projects ¼ inch from one end. Proceed in a like manner with the other screw, forming a second coil exactly like the first one.

These coils are to be held with the projecting end of the cores firmly clamped against the poles of the horse shoe magnet. This can easily be done by screwing the projecting ends into a strip of hard wood, which is 2¼ inches long, ½ inch wide, and a scant ¼ inch thick. Bore two holes in this, ⅝ inch apart and equally spaced each side of the center of the strip. These holes should be of just the right size so that the iron screws will fit them tightly. The screws should project a little through the back of the wooden strip. The strip is then screwed to the base wood board forming the back of the box first constructed, in such a manner that the screws are each held firmly against the poles of the magnet. Connect one end of one coil to one end of the next in such a manner that if a current should flow through the coils it would go around one coil in a direction opposite to that in which it goes around the other. Connect the free ends to the binding posts shown.

The diaphragm D is of thin soft iron called ferrotype iron such as is commonly used by photographers. It can be purchased at a photographic supply store. Cut out a circular piece 2½ inches in diameter. Clamp it to the front of the cover covering the hole cut in the latter. It is held firmly all around its edges by a circular block of wood S, but this block must not touch the disc except at its edges. Hence it is cut away on the under side as shown. The diaphragm should be free to vibrate at its center, and so it must not touch the ends of the iron screws around which the coils are wound, although it should be as close as possible to them.

The mouth piece M is made of heavy card board. The stiff cover of a blank book is excellent material. It should be 2 inches in diameter at the large end, and ⅝ inches in diameter at the small end. The cover of the box is fastened on by means of small brass screws.

Oil or tar is used as an auxiliary to coal on express locomotives for the Eastern Railway of France. Each injector allows the burning of 220 pounds of tar per hour under good conditions. The tar receiver holds one ton.

There is a surprising demand for American cotton fabrics and yarns in Eastern Turkey, which at present the market is unable to supply.

Frank Rennicks, 8 feet 4 inches tell, 21 years old and still growing, was discovered in Europe by Frank C. Bostock, who brought him to America a few days ago for exhibition.

In Ashanti there grows a tree resembling in appearance the English oak, which furnishes excellent butter. This vegetable butter keeps in perfect condition all the year round in spite of the heat.

HOW TO MAKE A BOY KITE.

A boy kite with bright colored coat and vest and gay striped trousers standing high in the air always attracts attention and affords splendid sport for the American youth in spring time.

In making a boy kite it should be remembered that the larger the boy is the better he will fly. To construct the frame two straight sticks, say 3½ feet long, should serve for the legs and body; another straight stick forms the spine and should be about 2 feet 4 inches long. For the arms get a fourth straight stick about 3 feet 3 inches long. Make the frame for the head by bending a light, tough stick in a circle about 7 inches in diameter. Bind it tightly with a strong thread and through its center run the spine. Then tack on the arm stick three inches under the circle so that the spinal column crosses the arm stick exactly in the center. Wrap tightly with strong thread, and tack on the two sticks that are to serve for the legs and body. The leg sticks should be fastened to the arm stick about six inches on either side of the spinal column, and crossed so that the other ends are three feet apart. Tack them and the arm stick together at the point where they intersect. Small hoops and crosses of wood of the same material as the head frame should be fastened to both extremities of the arm stick and the lower ends of the leg sticks for the hands and feet. See that both hand frames are exactly alike, and exercise equal caution regarding the foot frames; also see that the arm stick is at exact right angles with the spine stick and that the kite joints are all firmly tied and the kite evenly balanced; otherwise it may be lopsided. Fasten on the strings of the frame beginning at the neck at equal distances from the spine, as indicated by the dotted lines in Fig 1. Extend a string slantingly from the armstick to the head on both sides of the spinal column, and run all the other strings as shown in the cut, being careful that both sides of the frame correspond in measurements.

To cover the kite select different colors of paper to suit your taste and after pasting them together lay the paper on the floor and placing the frame on it, cut out the pattern. Leave

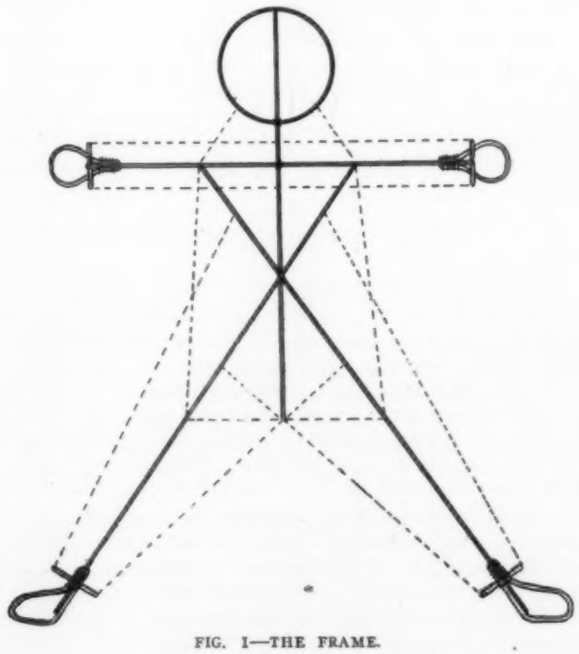


FIG. 1—THE FRAME.

an edge of one-half inch all round and make a slit in this edge every six inches and at each angle; make the slits two inches apart around the head. This is to prevent the paper from splitting when the work of pasting begins. After the kite is pasted and dry paint the buttons, hair, eyes, hands, feet, etc.,

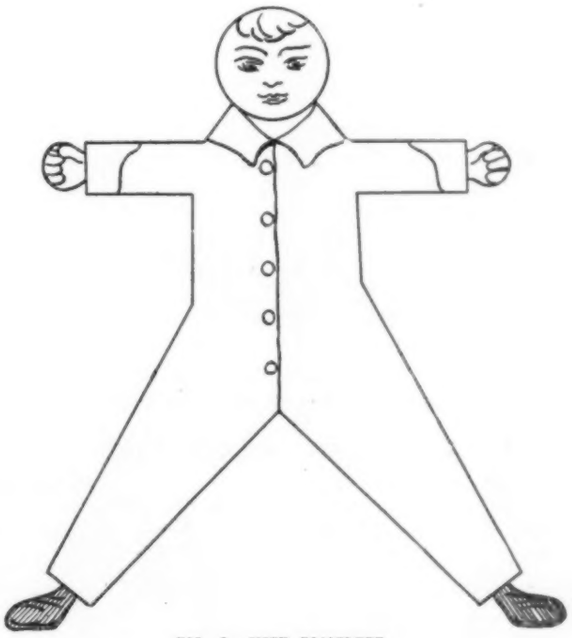


FIG. 1—KITE COMPLETE.

as you desire. See Fig. 2. Arrange the breast band and tail band and attach the kite string in the same manner as in the ordinary coffin-shaped kite.

FROM NEW YORK TO ST. PETERSBURG BY RAIL.

Great Possibilities of the Trans-Alaskan Road, on Which Work Begins April 15.

Five years is given as the utmost time required for completing the Trans-Alaskan railroad, which will almost make possible the trip "around the world in parlor cars." When the road is completed a person may travel from New York to St. Petersburg or Paris entirely by rail excepting a thirty-mile transfer across Behring strait in enormous steel lighters. The Age of Steel says:

"Capitalists, engineers and explorers have completed the preliminary work and have arranged to start building the Trans-Alaskan road April 15. The line, which will be 850 miles long, will open up one of the richest countries in the world, but more interesting and spectacular than that is the certainty of its making what is practically an all-rail route to Asia. F. S. Granger, a Seattle capitalist, who is one of the promoters, said:

"'The plans provide for a single track road from Illamna bay, inside of Cook's inlet, to Port Clarence, on Behring strait, to connect on this side with the steamers over the Trans-Alaskan railway running from Seattle and on the other steel ferries to make direct connection with the Trans-Siberian railroad. In 1907 one can go from San Francisco to St. Petersburg or Paris in twelve or thirteen days; the old world and the new will be brought together, and great mineral and agricultural lands will be thrown open and greater wealth than one dreams of will be reaped.'"

Dr. Charles M. Thomas, of Philadelphia, has succeeded in supplying a patient with a new set of eyelids by grafting skin taken from the patient's lips. The patient lost both the lower and upper eyelids by being enveloped in a burst of flame.

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A SKY-CYCLE.

There is a rapidly growing interest in navigation of the air, and it is by no means improbable that within the next ten years vehicles for aerial travel will be as common as automobiles today.

Carl E. Myers, who has a balloon farm at Frankfort, N. Y., writes in the Automobile Review of some of his experiments. He calls his strange craft a "sky-cycle," or gas kite, which is a

GAS KITE PROPELLED BY BICYCLE PEDALS AND HAND CRANKS.

combination of balloon and bicycle. The gas bag is made in the shape of an inverted boat from which is suspended a frame fitted with bicycle saddle and pedals to drive the propeller. It is steered by the inclination of the body; leaning forward to descend, backward to ascend, and to the right or left as on a bicycle. He has made several hundred voyages and without any accident to himself or air ship. Such a machine complete ready to sail can be built for $500, and weighs only 75 pounds. He is now at work perfecting a light gasoline engine, which he expects to introduce the coming summer.

He also exhibited at St. Louis in 1900 an air ship 13 feet long driven by a small electric motor current, to which was supplied

SKYCYCLE, AFTER 20 MILES VOYAGE, AT BROCKTON, MASS.

by wires leading to the ground. This ship was called the Electrical Aerial Torpedo, and was steered by electric devices controlled through wires. It carried no passengers, but was built to demonstrate its ability to carry and drop dynamite in military operations. It travelled in all over 600 miles while on exhibition at a speed of from 5 to 15 miles per hour.

LIGHT AT THE BOTTOM OF THE SEA.

The brilliant coloring of fishes at the bottom of the sea leads Charles C. Nutting to believe that light penetrates the water to that depth. He suggests the idea that it is phosphorescent light. In Harper's Magazine he says:

"Nothing has impressed me more profoundly than the rich and varied colors of the animals as they appear in the dredges, trawls and tangles, fresh from their home in the depths. Indeed any one would be struck with the rose-colored fishes, crinoids decked in brilliant yellow and purple, sea urchins with scarlet and white spines and yellow and chocolate tests, scarlet and white crabs, anemones yellow, white and crimson, graceful plumularian hydroids with fronds of golden yellow, and most beautiful of all perhaps, the exquisite pentacrini, or "sea lillies," usually of delicate hues, but sometimes a rich yellow. These colors are not meaningless, and there is but one plausible explanation for their widespread occurrence in the bottom of the sea, and that is the presence of some sort of light even at the greatest depths. We find coroboration in the study of the inhabitants of caves. Those which live in total darkness are almost uniformly colorless."

AERIAL BATTLE IN THE YEAR 2000.

H. G. Wells in his new book, "Anticipation," describes a battle in the clouds according to his predictions for the year 2000. After describing the havoc that the fleet of air ships, too high up to be seen, will work on cities, he says:

"Between flying machine and flying machine it will be a flight of hawks complicated by bullets and little shells. They will rush up and up to get the pitch of one another, until the aeronauts sob and sicken in the rarefied air and the blood comes to eyes and nails.

"The marksmen below will strain at last, eyes under hands, to see the circling battle that dwindles in the zenith.

"Then, perhaps, a wild, adventurous dropping of one close beneath the other, an attempt to stoop, the sudden splutter of guns, a tilting up or down, a disengagement. What will have happened? One combatant, perhaps, will heel lamely earthward, dropping, dropping, with half its bladders burst or shot away, while the other circles down in pursuit."

Such will be the opening phase of the war that is speedily to come.

GREATEST HOUSE CLEANING ON RECORD.

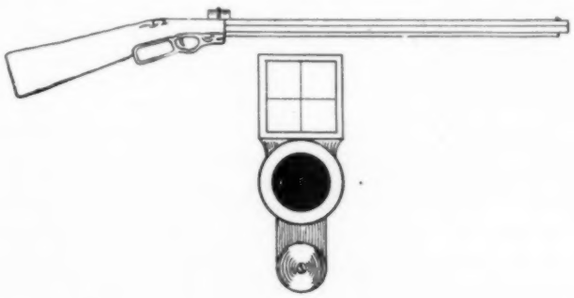
Palace of the Pope Swept and Scoured Throughout for the First Time in 400 Years.

For the first time in 400 years the Vatican has had a house-cleaning. The work, which has just been completed, required eight months. The papal castle is a collection of separate buildings occupying a space of 384 yards in length and 256 yards in breadth. The number of its chambers, halls and galleries exceeds 11,000. Five thousand house-cleaners, nearly half of whom were scrub women, were employed. To keep this mass of work people in order 700 overseers were appointed. Ten tons of dirt a day were removed; 2,200 scrubbing brushes were used up weekly; likewise 5,000 pounds of soap, 2,000 pounds of soda and 8,000 brooms. The work cost nearly $250,000. The house flannels contributed by the Irish Catholics amounted to 100 bales and would clothe 10,000 people. The prevailing unsanitary conditions of the Vatican is believed to have been due to the absence of the female element in the palace.

GUN SIGHT THAT IS UNERRING.

New Invention That May Make Every Man a Crack Shot.

A new rifle sight which, it is said, will make every man who uses it a crack shot has been invented by Sir Howard Grubb. The apparatus consists of a small sheet of semi-opaque glass upon which is engraved a cross. In looking through the sight the marksman apparently sees this cross projected on the object at which he is firing. It is more difficult for him to miss than to hit the target when once he has become acquainted with the



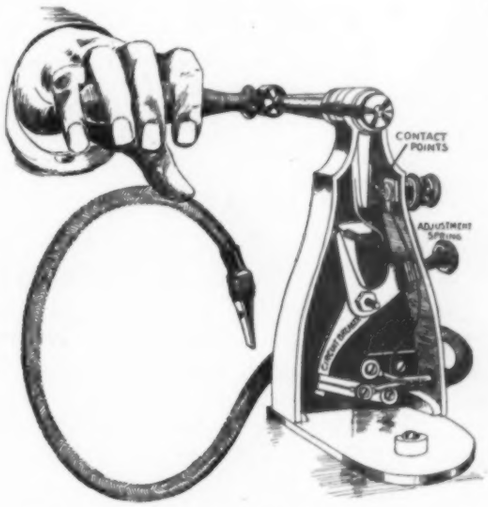
simple methods of firing. In the dark the cross which guides the marksman's eye is illuminated. The invention is expected to work wonders in armies where poor shots are numerous.

NEW TELEGRAPH SENDING APPARATUS.

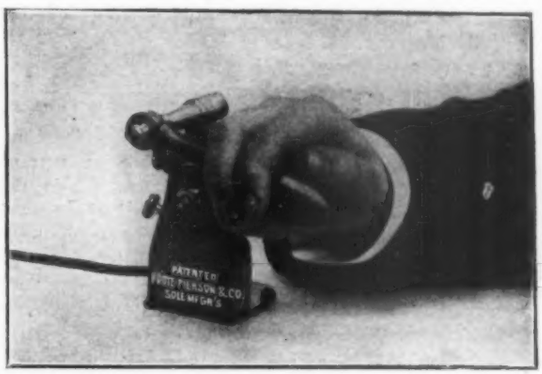
To the casual observer the telegraph instruments used in Boston, Chicago and San Francisco look alike. In fact the general principle is uniform and the use of the rubber button "key" is general. In sending the message the electric current is "broken" into short and long impulses like hyphens and dashes, and by combinations of these short and long sounds the alphabet is made and words spelled out. In sending the operator is obliged to use a certain set of muscles so constantly that they become greatly fatigued, and frequently what is known as "telegrapher's paralysis." Sometimes this becomes permanent; then the operator finds his occupation gone.

To obviate this disease and by a mere general distribution of the work among the muscles of both the arm and hand, a new sending device is being made by Foote, Pierson & Co., of New York. The first experience the operator has when using this "Twentieth Century" sender is a pain in the muscles of the upper arm, proving at once that the rigid and contracted movements of the old-time sender is done away with, thus giving the only practical relief to men who have "lost their grip," but find it necessary to continue in service.

This instrument was invented by Charles Shirley, manager of the operating department of the Postal Telegraph Company, in New York City.



The small cut shows the portable instrument, which can be carried from table to table, the operator always using the same

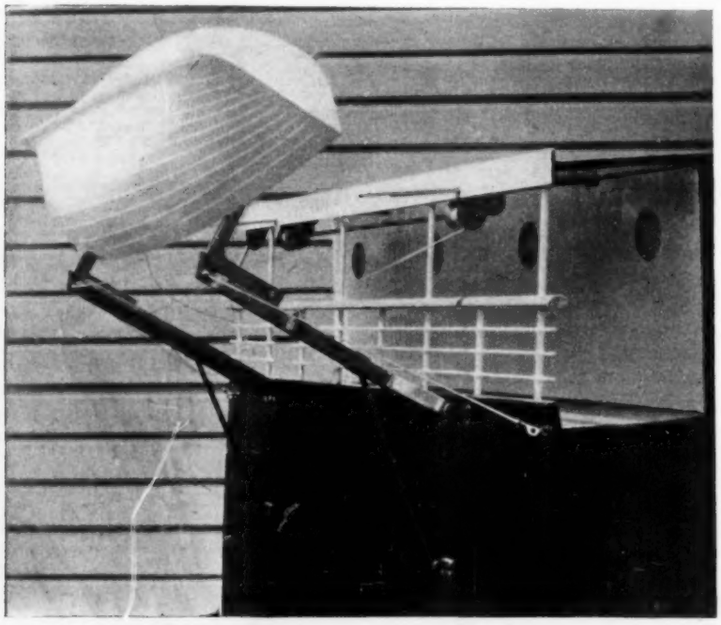


instrument. The second cut shows the sender with cover removed to reveal inside mechanism, the third cut the device in use.

"The old style of Greek architecture is dead," declares Prof. O. L. Triggs of the University of Chicago. "It is not useful and consequently is not beautiful. The fine arts are gradually dying out. Socialization in art, which means the fusion of the beautiful and useful, is the new movement which is crowding the art of centuries ago out of existence."

BOAT LAUNCHING DEVICE.

It is one thing for a ship to be fully equipped with life boats to use in emergencies, but quite another to be able to make use of these boats. To launch a small boat during a panic on board ship or while a fierce storm is raging is a most difficult task. To facilitate boat launching at such times has engaged the inventive genius of Wilbur F. Powers, of Seattle, Wash., and we illustrate his device. By his apparatus a boat is swung out from the ship and lowered automatically by ropes wound on drums, which not only drop it in the sea properly, but prevent the waves dashing the small boat against the ship. Before fully lowering the boat is loaded through a narrow gangway, which restricts the passage to one person at a time.



NEW BOAT LAUNCHING DEVICE.

The device is operated by electric motors, one set for each boat, and all controlled by wires from a central station on the bridge. When the boat with its load is safely launched the lowering arms automatically release it and then the sailors use the oars.

FLOWERS GROW IN THE HUMAN BODY.

In every human body there are large tracts overgrown with a species of flower, says Dr. Elias Metchnikoff, the well known Zoologist and Entomologist. As a general thing these floral growths make their appearance between ten and twelve hours after the birth of the child. They are a kind of vegetable microbe.

Dr. Mueller of Berlin has described more than 30 species of vegetable life which inhabit the cavities of the mouth. When the infant is weaned the number of these microbes becomes still greater. In a healthy man there are between 60 and 70 various species.

At birth man is not inhabited by any microbes, but immediately afterward the surface of the skin and the mucuous membranes are rapidly populated. The germs derive their sustenance from the air and from the water which is used to bathe the infant.

FLOATING BUTTON FACTORY.

A floating button factory has been put in operation on the Mississippi river. Instead of having the raw material hauled to the factory this factory goes to the raw material. It is in the shape of a boat 42 feet long and 12 feet wide, says the Canadian Engineer, fitted with all machinery necessary for the manufacture of buttons and a three horsepower engine. The buttons are made of mussel shells. It used to cost heavily to transport the shells to the factory. Now the boat floats along until a bed of mussel shells is found when it drops its anchor and goes to work. When the bed is exhausted it starts out in quest of another.

PAPER MONEY MADE INTO CAR WHEELS.

Millions of dollars in United States currency is macerated every month and made into car wheels. It makes one of the best filling known for wheels used by the American railroads. This is not circulating currency that is thus transformed into rolling stock, however, but cancelled bills of all denominations. The old bills are prepared into a pulp and sold to the wheel manufacturers for $40 a ton. Last year $100,000,000 worth of currency was cancelled and converted into car wheel filling.

SUNS' HEAT AS A SOURCE OF POWER.

Harnessing the sun's rays for the generation of steam is a new and remarkable achievement in California. By utilizing the heat energy which comes from the sun steam of sufficient forces was produced to pump 1,400 gallons of water per minute against a head of 12 feet. This was accomplished by means of a solar motor erected at the ostrich farm at South Pasadena, Cal. A reflector was built in the shape of a huge open glass umbrella, 32 feet in diameter. The parabolic reflecting surface, 640 square feet, says the Metal Worker, is always automatically turned toward the sun by means of clock work so that the rays are focussed in rings on the central tube or boiler, which takes the place of the stick in the umbrella. The boiler is a tubular one, holding about 100 gallons of water. At a test 192 gallons of water per hour was evaporated, forming steam of 150-pound pressure. The motor is rated at about 15 horse-power and cost $2,500. The apparatus is used for pumping water for irrigation purposes.

ARMY HAS WIRELESS TELEPHONES.

The signal corps of the United States army has succeeded in sending messages by telephone without the use of wires. The messages, it is said, were sent 480 feet, and better results are expected in the near future. The system is practically the same as that employed by wireless telegraphy, but is necessarily more delicate; as words must be produced instead of dots and dashes. The signal corps has been making practical use of wireless telegraphy at San Francisco for nearly two years, a fact that is not generally known.

THE AUTOMOBILE PLOW IS HERE.

At last the automobile plow has come: but it was invented by Dr. Richard J. Gatling, of St. Louis, and so is called the "Gatling" Motor Disc plow. It is expected to revolutionize the science of farming, says the Age of Steel, as much as the Gatling gun revolutionized the methods of warfare. The plow is operated by steam. It may use coal, wood, oil or gasoline for fuel. A wheat drill may be attached and the grain sown as the soil is turned. The motor may be separated from the plow and used for all kinds of heavy hauling. The plow, which is a huge, many pointed device, and operated by one man can accomplish as much in a day as 40 men with 80 horses using old-fashioned plows.

VIOLIN PLAYING INJURES WALLS.

Great Force of Vibrations Shakes Buildings and Does Great Damage.

Violin playing often does serious damage to the walls of buildings, according to an Indianapolis architect. The vibrations of a violin, he says, are something terrible in their unseen, unbounded force, and when they come in contact with regularity they bear their influence upon structures of stone, brick or iron. Of course it takes playing for years to loosen masonry or to make iron brittle, but that result is obtained. It is the regularity of the vibration that causes the damage. A frame building would not be damaged, because the timbers are flexible, but it is different with masonry. The architect said:

"A dog can shake a suspension bridge. There are some great and valuable bridges which dogs are never allowed to cross except when carried. You see, in that case it is the regularity of the vibration that is so powerful. The first step on the bridge is not noticed so much, but every step comes just alike, at the same interval and with the same firmness. The force gathers momentum and each step makes the bridge sway more. Raise one of your feet on tip toe as you sit down and work the knee up and down regularly and you will shake the floor more than a whole room full of people could by jumping."

NEW YORK CENTRAL'S NEW LOCOMOTIVES.

The "Central Atlantic" locomotives are the most powerful high-speed passenger locomotives ever built. It is true that the New York Central has other locomotives, in passenger service, which can haul heavier trains at slower speeds, but in high-speed passenger service it is not so much "brute force" that is reqiured, as plenty of steam from the boiler to supply the cylinders. Other things being equal the greater the speed the greater the number of times per minute the cylinders must be filled with steam, and the "harder the kettle must boil" to supply the steam.—From Four Track News for March.

BIRDS ARE SKILLED SURGEONS.

Many birds possess the faculty of skillfully dressing wounds. Some will even set bones, taking their own feathers to form the bandages. A French naturalist writes that he has often killed birds that were when shot, convalescing from wounds previously received. In every instance he found the old injury neatly dressed with down plucked from the stem feathers and skillfully arranged over the wound, evidently by the long beak of the bird. In some instances a solid plaster was thus formed, and in others bandages had been applied to wounds or broken limbs.

EFFECTS OF INDUSTRIAL WASTE ON FISHES.

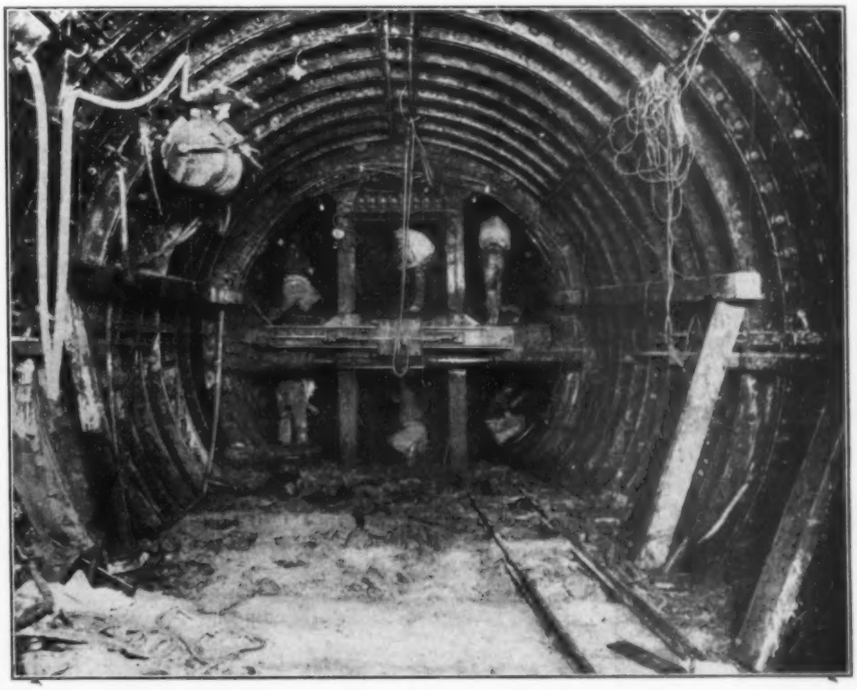
Sawdust does not directly injure fish, according to the discovery of Dr. Kingston, though it may interfere with their spawning or food supply, says the Canadian Engineer. Trout can live in a tank of water where a quantity of sawdust is kept constantly stirred. Waste water of paper mills is not dangerous if mixed with more than ten times its volume of clean water; from gas works it is more poisonous, one part in two hundred being fatal; from nail works the hydrochloric acid and iron is worse still, one part in a thousand being fatal, and as it is heavy and goes to the bottom it reaches the fish feeding there.

COAL FIELDS OF THE UNITED STATES.

The total coal areas of the United States, as will be shown in the ensuing 22nd annual report of the United States Geographical survey, amounts to 280,397 square miles, exclusive of Alaska and also of vast areas of lignite coal. Of this area about 55 per cent is producive. Pennsylvania ranks seventh in area, but is probably first in production. There is observed a general movement of the coal westward; says Western Electrician a tendency due chiefly to the higher grade of the eastern coals. The region west of the 100th meridian; about half the area of the United States, Alaska excepted, contains less than 20 per cent of the coal fields.

BUILDING A RAILWAY UNDERGROUND.

One of the most interesting and extensive engineering operations in progress anywhere today is that of the Great Northern and City Railway, London. This underground railway, or "tube" as it is called there, is progressing rapidly, the work being prosecuted day and night. Two tunnels are being built, one for each track. The tunnels are about 60 feet below the surface, and elevators will carry passengers from the street to the stations below.



VIEW INSIDE SHIELD ON STRAIGHT TRACK, SHOWING METHOD OF DRIVING.

The tunnels vary from 16 to 23 feet in diameter.

The manner of excavation is described fully in the Street Railway Journal, and is being done by means of a shield which is driven forward as fast as the excavation is made. Iron rings are then bolted in place to form the tunnel. The shield is a steel cylinder 8 feet 9 inches long and is pushed forward by hydraulic power as fast as the men remove the clay. Six men can excavate at the same time.

The cars will be operated, lighted and warmed by electricity, and will be constructed of steel so as to be fireproof.

Pneumatic tube service for mails and parcel delivery may be installed in the big tunnel of the Illinois Telephone and Telegraph company in Chicago.

An English professor says women are incapable of learning the Chinese language. A Chicago editor, therefore, sugests that this be made the universal language.

FOR THE MADAM.

HOW TO PREPARE POTATOES.

Stuffed—Select potatoes of equal size and shape, wash and scrub well and bake. While they are still hot cut a piece off the top of each, and with a spoon scoop out the potato, leaving the skin unbroken. Mash and season, using a little hot milk and beating it well to make it light. Fill the skins with the mashed potato, letting it rise a little above the top of the skin. Place a piece of butter on the top of each and put them in the oven to get well heated and slightly brown the top, or cut the baked potatoes in two, lengthwise, and when the skins are filled, smooth the potato even with the skin; brush them with egg and set in the oven to glaze.

Note—This is the first of a series of articles to appear on methods of preparing potatoes.

SKILLED WOMEN MARBLE CUTTERS.

Deftness of woman's hand has opened up for her a new field of livelihood—marble cutting. Many women in the United States and Canada are engaged in the trade and some of them have acquired a skill which, it is said, can scarcely be equalled by the masculine marble cutter. Among those whose skill has won for them unusual distinction might be mentioned Miss Alice E. Rigg, of Windsor, Ont.; Miss Lucy J. Daniel, of Exeter, Mo., and Miss Pearl Sams, of Great Bend, Kan.

GIVE INFANTS WATER.

Every infant needs water just as much as grown people. Milk and baby foods will not take the place of it. It should be given in teaspoonful doses twice daily the first week of life and increasing in frequency and quantity every week till the child walks and talks, says Osteopathic Health. Many mothers and many nurses permit babies to parch up and die of thirst. Many a doctor called to see a sick infant at once detects this stupid error and prescribes only water.

PNEUMONIA AND EXPOSURE TO COLD.

It is years now since the medical profession gave up the idea that exposure to cold was capable per se of giving rise to pneumonia; we know that the disease is due to a specific micro-organism, says the N. Y. Medical Journal. But the notion that "this is good weather for pneumonia"—meaning cold weather—still holds almost unquestioned sway among the people. It is said that the President's son, ill with pneumonia, has been in the habit of taking long walks in the country bare-headed, and that in this practice he has been joined by a number of his school-mates. To this exposure of the head to cold some newspaper writers have felt inclined to attribute the pneumonia. No argument is needed to upset this theory; we have only to point to the experience of the pupils of Christ's Hospital, in London, commonly known as the "blue coat school" on account of the garb worn by the boys. The small blue worsted cap which has always formed part of their uniform they seldom wear, having cast it aside soon after the founding of the school, in 1553. They are to be met with in all parts of London at any season of the year and in all sorts of weather, always bare-headed. This practice of theirs has been going on for more than three hundred years now, furnishing on a large scale experimental evidence against the notion that cold causes pneumonia, for the disease has been no more rife among them than among other school boys.

HOW SNAILS ARE RAISED.

Paris consumes 800,000 tons of snails every winter. With Burgundy, the two departments of Savoy, are the greatest suppliers. They are bought at the rate of 8 to 9 francs ($1.80) per thousand. They are first sent to Auxerre in order to be resold at Paris as coming from the vineyards of Dijon and Macon. Some intelligent speculators have a certain manner of raising snails. They huddle them together in pans built of smooth planks coated with tar, in order that the molusk may not be able to climb the length of the wall.

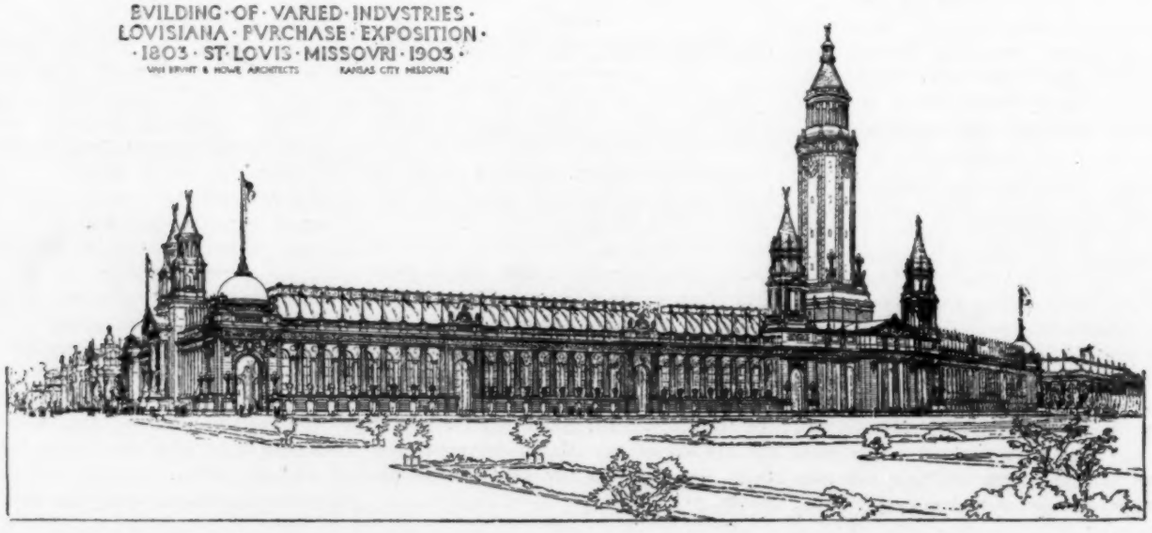
In the olden times at Rome there were raisers of snails who used degrees of refinement that are now among the lost arts. It is thus that a certain Fulvius Merpinus, according to Pliny, nourished his snails on flour and wine and they were particularly appreciated by the Roman epicures.

The British admiralty has contracted for the building of five first-class and two third-class cruisers and two battle ships.

A cemetery devoted to dogs, cats and other domestic animals is located on the Ile des Cheins, or Island of Dogs, in the Seine river, near Paris.

A BEAUTIFUL WORLD'S FAIR BUILDING.

The Varied Industries Building is to be one of the most artistic of the Louisiana Purchase Exposition. It contains between its building lines an area of 569,000 square feet. Two interior open courts have an area of 121,000 square feet, leaving a net area of the building under roof of 448,000 square feet or 10.3 acres. The mean length is 1,060 feet, the width is 525 feet. At the north front forming its central feature is a tower 350 feet high and at the south front opposite the tower is a dome 160 feet in height.



MILK COWS TO QUENCH A FIRE.

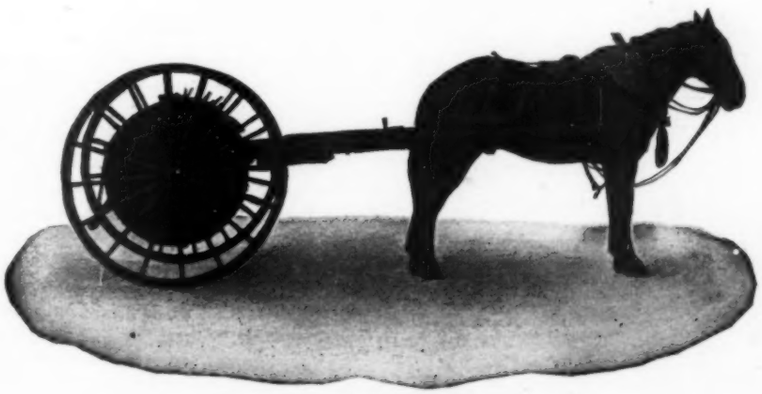
The well was 100 yards away and when a fire broke out in the hay barn of Joseph Dickinson of Woodbridge, Conn., a short time ago all members of the family went to work milking the cows and as fast as the milk was obtained it was thrown on the flames. After several minutes' hard work the fire was extinguished, but ten cows that were in the barn at the time were badly burned. The fire was started by a lantern, and as the hay was dry it burned fiercely. Dickinson and an assistant had just finished milking some of the cows and there were 40-quart cans of milk at hand, says the Western Fireman.

Dickinson and his man each seized one of the cans and began pouring the milk on the flames, at the same time giving the alarm. Other members of the family, seeing the danger of the fire spreading, set to work milking the remaining cows, and soon with the additional milk the flames were quenched.

NILE DAM WILL RESURRECT EGYPT.

The great dam now being built across the Nile at Assouan will have the effect of resurecting Egypt from the grave-yards of nations that are dead. It will bring under cultivation 600,000 additional acres of land. Besides the dreaded floods and droughts along the valley will be a thing of the past. An area of 5,000,000 acres will thus become second to no crop-producing land in the world. Over the whole area the value of summer crops will be increased $30 per acre.

Two years have passed since the foundation stone of the great dam was laid, says the Age of Steel. It was bedded on a high portion of solid rock. The massive wall has been steadily built up of ashlar granite, welding together the rocks which form the first dangerous first cataract. The length of the dam is 6,000 feet. It will create a lake 144 miles long, impounding more than 1,000,000,000 tons of water. At periods 900,000 tons a minute will gush through the sluices. The dam will raise the river 66 feet above its previous level. The openings of the sluices are to be lined with cast-iron 1½ inches trick to guard against the impact of large volumes of water at high velocity.



LOADED

Thousands of dollars worth of American false teeth have been smuggled into Canada for years past, according to disclosures recently made by the Dominion Customs authorities.

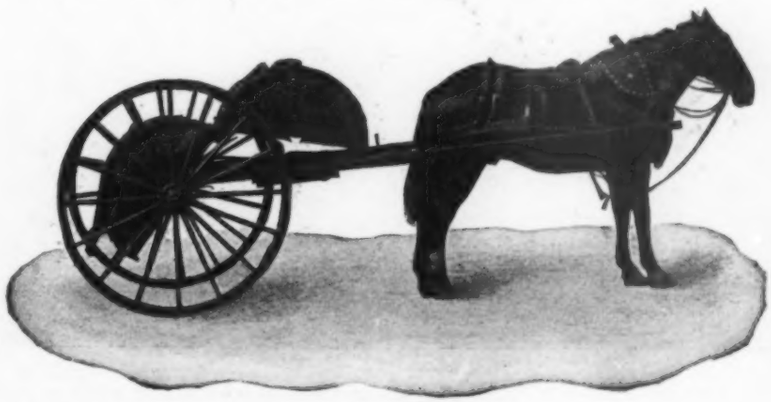
MIXES CONCRETE WHILE HAULING.

The use of cement and concrete work has become almost universal. Sidewalks, foundations, railway bridges and even houses are being made of cement. A prime factor in successful cement work is good mixing, for seldom is the cement used alone, but with a large percentage of sand or crushed rock.

READY TO LOAD

Much of the cement has to be moved a considerable distance, and where this is the case the mixing can be performed while hauling. Fisher & Saxton, a well-known engineering firm of Washington, D. C., have devised a portable mixer which they call the "Dromedary." Our illustrations give an excellent idea of the machine, which is drawn by one horse. The crushed rock, sand, cement and water are placed in the dromedary, which is made to revolve with the wheels which carry it, and when the destination is reached the machine is opened and delivers perfectly mixed concrete ready to tamp and set. The machine was invented for street railway track work in Washington, where objection was made to mixing the cement along the street.

A continuous performance of "Uncle Tom's Cabin" is to be one of the features of the St. Louis exposition.

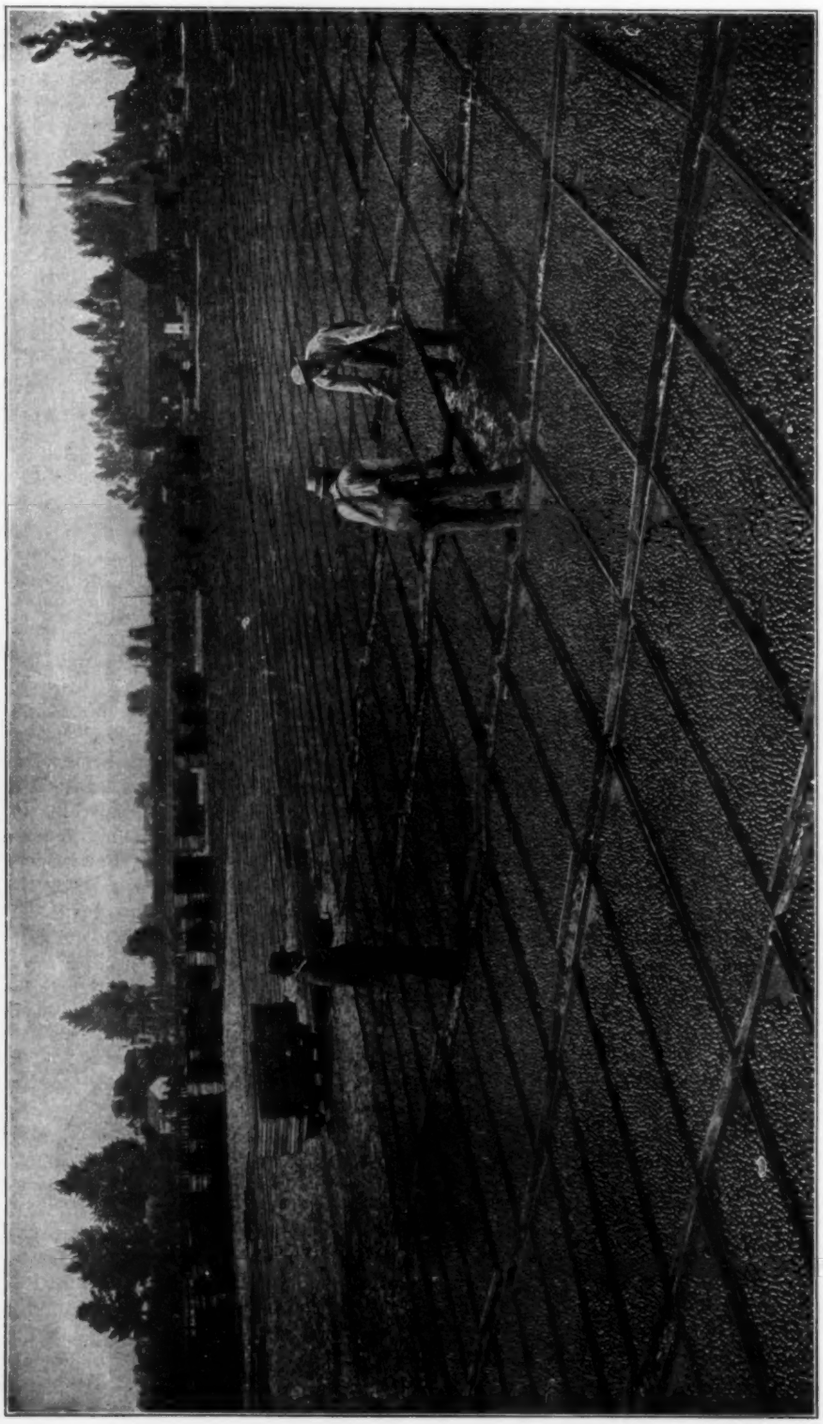


DUMPING

The United States courts have decided that Edison is not the inventor of "moving pictures."

RAISING PRUNES IN CALIFORNIA.

One of the most lucrative industries of California is prune-raising. As the Four-Track News says, "California is literally full of prunes." The accompanying illustration shows the manner in which they are spread out to dry. These drying grounds covering many acres of space are familiar sights in California. There are 72,000 acres of bearing prune trees in the state. The average crop is about 110,000,000 pounds per year. The French prune is more generally grown in California than any other variety. It is a constant surprise to housewives, says a western traveller, to find how many wholesome and delicious things can be made with prunes. There is perhaps no other article which so successfully combines the valuable points of palatability, healthfulness, nutrition and economy as does the prune.



DRYING PRUNES IN THE SUN IN THE SANTA CLARA VALLEY, NEAR SAN JOSE, CAL.

The prune, which is a species of large plum, upon being gathered is placed in a large sieve and hastily dipped in strong lye, then dipped in clear water and laid one layer deep in trays which contain about 60 pounds of green fruit. These trays are then placed in the sun, as shown in our illustration. After drying, which requires several days, the prunes are graded by being run through a machine which sorts them to three sizes. They are then ready for packing and the market. Should a rain occur, which is rarely the case at this time of the year, the trays with drying fruit must be piled up one upon the other and covered. It is not a small task to pile up the many thousand trays which are frequently seen at one time covering 5 acres of ground.

MAN'S BODY HIS MOST POWERFUL MACHINE.

A human body is more powerful than any machine of man's invention. Physiologists calculate the work done by the body in foot tons, a foot ton of work being represented by the energy required to raise one ton weight one foot high. A hard-working man develops about 3,000 foot tons a day in the work involved in the acts of living and his external labor. A man's heart in 24 hours shows a return equal to 120 foot tons; that is supposing he could concentrate all the work of the organ in that period into one big lift, it would be capable of raising 120 tons weight one foot high. The breathing muscles in 24 hours develop equal to about 21 foot tons. Add this to the actual work of the muscles and that expended in heat production and 3,000 foot tons are arrived at as the approximate daily expenditure of energy. All this power is developed on abount 8 1-3 pounds of food a day, the supply including solid food, water and oxygen.

PHONOGRAPH RECORDS THE LOST WILL.

A wealthy Russian died not long ago and his heirs could find no will. One day a young man seeing a graphophne in the library, put into it what he supposed to be the record of a song. The words which came forth were those of the missing will in the dead man's voice. The will thus curiously recorded has been submitted to the courts.

General Funston says that there is no war in the Philippines; it is true that murders are of frequent occurrence; that assassins lurk in ambush and shoot down their victims passing by; that there are deadly feuds and combats that cause great waste of human life, and that blood flows in profusion in the Philippines, but there is no war, no more than there is war in Kentucky.

What pies do school boys usually dislike?—Copies.

COALING BY CABLE.

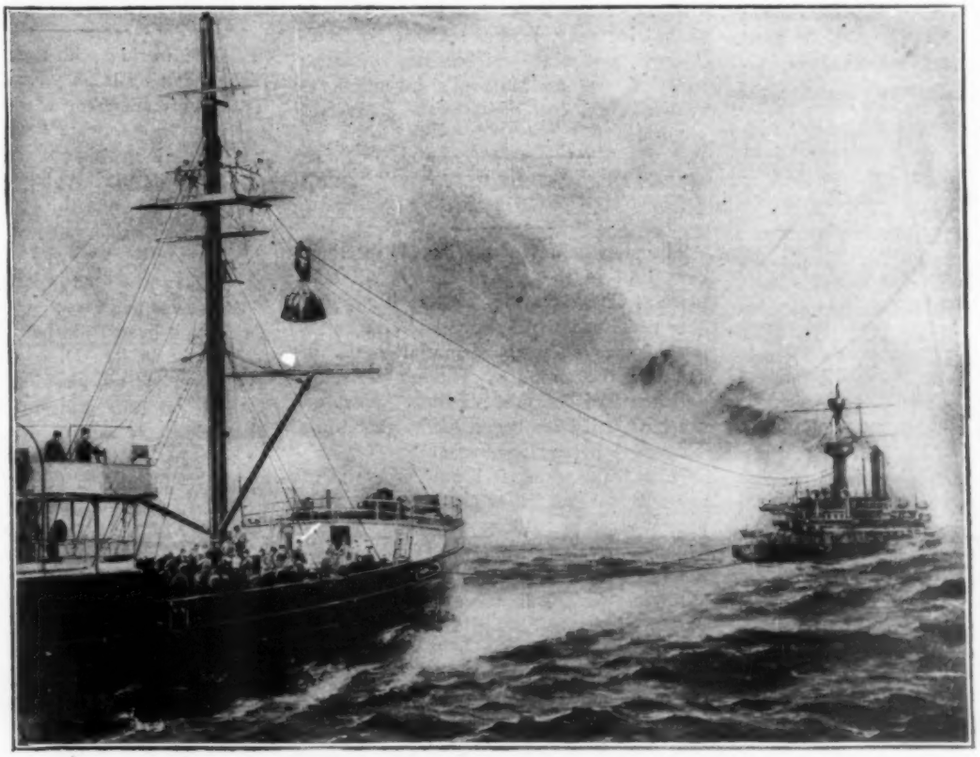
The problem of coaling at sea has at last been solved. The solution is found in the marine cableway, which system is soon to be put in service in the United States navy by the Lidgerwood Manufacturing Company. The new method has already been satisfactorily tested in American waters and also by the British admiralty and probably will become universal among the navies of the world. In the British test 40 tons of coal per hour were loaded and the distance between the battleship and the collier was 400 feet.

A traveling carriage takes the coal bags from the elevator, says President Lidgerwood, and transfers them with great speed to the warship. A trip every minute is easily accomplished. The traveler is propelled back and forth by a wire rope one-half inch in diameter, operated by two direct acting engines having two 10 by 10 inch cylinders and slipping drums. To keep an equal strain on the main cable between the vessels a main cable tension engine is used. This automatically keeps the cable taut, while permitting its length to vary with the tossing of the ships.

The appointment of Robert C. Clowry of Chicago to the presidency of the Western Union Telegraph Company, to succeed Gen. Thomas C. Eckert, retired, will probably result in promotions all along the line.

WORLD'S FINEST BASKET MADE BY A WOMAN.

The finest basket in the world was made by an Indian woman. It is no larger than a pint cup and is now in the National Museum. The woman's name is Keshbim. She is of the Yokiaia tribe and lives on the Russian river, California. The delicately woven coiled basket is a marvel of workmanship which reveals an art that is fastly dying out. Keshbim worked seven months in weaving it and its value is beyond the purchasing power of money. The foundation of the basket is of willow rods and the sewing is done with roots spliced so fine that in some parts there are sixty stitches to the inch. The tools employed by the California Indian basket makers consist only of a rude knife and a pointed bone.



BRITISH BATTLESHIP "TRAFALGAR" COALING AT SEA.

SHRIMP FISHING ON HORSEBACK.

Fishing on horseback is the method most successfully employed in catching shrimp along the edge of the North sea in Flanders, where it is one of the chief industries of the inhabitants. In saddling the horse the fisherman first adjusts a thick pack padded out with straw. On either side of this are large panniers destined to receive the catch. The traces for dragging the net are attached to the collar in the ordinary way, and the net itself is poised behind the pack. An extra basket is hung onto the side. Parties of three or six fishermen, says The Wide World Magazine, generally meet at the edge of the sea, spread out their nets behind them and ride out to sea. When they reach the proper distance they turn round and proceed up and down, dragging their nets parallel to the shore. Then the fishers come back to shore and deposit their takings in glistening piles.

THE MYTH OF THE MOUND BUILDER.

One of the greatest myths in existence is that of the American mound builder. The mounds, which traditional fiction says were erected by a prehistoric race, that lived many thousands of years ago, were all built by the North American Indians many within 75 years of the present time. Dr. C. A. Peterson says:

"There has never been a single fact—not even the slightest circumstantial evidence in existence—upon which to construct the theory of a prior, superior, separate race having been the builders of the mounds, but as long as men love darkness rather than light and accept a pleasant fiction in preference to a hard fact we must expect the pathway of knowledge to be clouded with just such mythical mists."

The mounds were used by the Indians for interring the bones of their dead. Mound walls, such as are found in Ohio, were still being built by the Mandans and Arikarees about their villages on the upper Missouri river in 1804 and 1811.

WEATHER CANNON IN ITALY.

Weather cannon are used in the vineyard districts of Italy to prevent thunderstorms and heavy hail storms. They are common sights to the traveler in that section and at the approach of a black cloud their thundering may be heard from all directions. The largest ones would hold three or four men in their bell shaped openings. Belching forth their contents an effect is produced on the vapor which, it is claimed, frequently prevents it from condensing and descending. The framework is really a mortar and is opened by means of a lever. After the cartridge is inserted the mortar is closed and fastened by a set screw. Con-

nected with the cartridge is a percussion cap. When it is to be discharged the "gunner" simply strikes the cap with a small hammer.

WIRELESS TELEGRAPHY AND THE OCEAN.

Wireless telegraphy presages a new era on the seas and probably marks the dawn of a new civilization. Soon there will be steamship dispatchers with duties similar to those of the train dispatcher. The path, location and condition of every steamship may be known at any and all times. No longer will there be "mysteries of the deep" and vessels with fates unknown. Every ship may be followed as accurately by those on shore as may a tourist train on land.

Already a daily newspaper has been established on one of the "ocean greyhounds." Soon these publications will furnish passengers on board with condensed accounts of the world's news. No longer will there be that absolute isolation that monotonous "off-the-earth" feeling experienced by ocean travelers. Illness and death on land could be communicated to relatives on shipboard. Business men need not longer have the fear of complications arising during an ocean voyage without their ability to give instructions. Vessels in distress could appeal for aid. The discovery throws a flood of light on the great ocean; it is equivalent to a century of ordinary advancement in civilization. Its magnificent possibilities seem infinite.

No greater agent for the peace and civilization of the world has yet been found than telegraphy, says the Coast Seamen's Journal, and when it becomes of such practical use as Marconi's invention, at such a slight cost we predict a greater civilization.

WILL BE AMERICA'S FIRST GOOD ROAD.

The most important good-roads meetings ever held in the United States will take place at Charlottesville, Va., April 2, 3 and 4, to make final arrangements for the building of the Jefferson Memorial road, to connect the tomb of Thomas Jefferson with the University of Virginia. Work on the road will have begun before that time. Thomas Jefferson once said:

"Could the dead feel any interest in monuments, the following would be my name's most gratifying: 'Here was buried Thomas Jefferson, author of the Declaration of Independence, of the Statute of Virginia for Religious Freedom, and Father of the University of Virginia.'"

The meeting will be held under the auspices of the Department of Agriculture, the National Good Roads Association and the Jefferson Memorial Road Association. President Roosevelt, his cabinet, the diplomatic representatives of foreign governments, the members of the senate and house of representatives, the governors of all states and territories and all Jefferson Clubs have been invited to be present. In a communication to Popular Mechanics W. H. Moore, president of the National Good Roads Association, says:

"This road when completed will not only recall to those who pass over it the life and character of the immortal Jefferson, but will also advance the movement for good roads throughout the United States.

NEW USES OF THE TELEPHONE.

Here are three instances of the swift pace of today: By stringing a wire from a locomotive cab to the telegraph line overhead, telephone messages were sent and received 400 miles away on the Illinois Central railroad without interrupting the line's regular telegraph messages. In case of disaster or emergency of any kind this instant communication between a train and the nearest station can be thus established.

A man arrested for an assault and in a hurry to be tried rang up a Kentucky Judge seven miles away, had his case heard by telephone, was fined $12, paid it, and was set free—all within half an hour.

At Oswego, N. Y., the other day two sweethearts who wanted to marry immediately, but could not because one of them was quarantined as a small-pox suspect, exchanged vows by the aid of a telephone, supervised by a clergyman. All things come to those who can't and won't wait.

WHAT CAN YOU DO?

This old world hasn't time to stop
  That it may learn your name;
It doesn't care a rap about
  Your blue blood or your fame;
The only thing this old world cares
  About concerning you
Is simply this one thing, to-wit:
  "Well, sir, what can you do?"

So don't waste time in hunting up
  A useless pedigree;
And don't bewail the fact that you
  Are not an LL. D.
But when the old world stops to ask:
  "Well, sir what can you do?"
Just roll your sleeves up elbow high
  And say, "Well, I'll show you!"

—Columbus (O.) State Journal.

A TARDY SIGNAL.

This will be a terror to boys who come late to school. The device includes a clock with ordinary dial which tells the time of day, and a mechanism which can

be set to display a signal at any hour. The cut shows the signal that is a sort of shingle which, with the word upon it, make a strong combination for any boy; nor is he likely to appreciate the glad hand extended.

SCHOOL LIKE BOOKER T. WASHINGTON'S.

Through the efforts of the Cuba Libre Industrial Association a normal and industrial institute for colored boys has been opened at Eldorado, Ill. It is the second institution of its kind in the world and is similar in purpose and scope to the school at Tuskeegee, Ala., of which Booker T. Washington is president. The new school is well equipped for work. It has fine farms and commodious buildings. Jefferson D. Alsten, a well-known colored educator, is its president.

APRIL 1902
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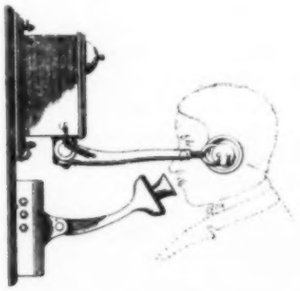
SUPPORT FOR TELEPHONE RECEIVER.

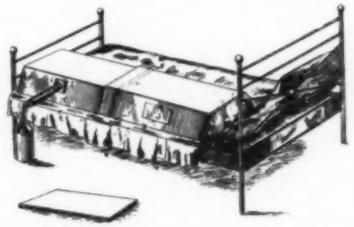
After a while we will have used our brains to such an extent we will have only to eat and breathe. There will be a ma-



chine to do all else. The latest muscle-saver, and which will be very acceptable, is here shown. The exchange is called by moving up or down the arm which holds the receiver. Then the receiver is held tightly to the ear by springs, leaving both hands free with which to make gestures while you talk.

BATHE WHILE YOU SLEEP.

With all the various kinds of baths to be had in these days the Americans should be a pretty clean people. The latest in this



line is the invention of Chas. M. Robinson of Toledo. The bather lies in bed, the bath tub is put over him, and when the steam boiler gets busy he thinks of the blankets and hot lemonades that mother used to make as something cool. It is not necessary to have a brass bed; the old-fashioned corded style will answer.

THE WONDERFUL NEW DEAD SEA.

The new dead sea discovered by Dr. Sven Hedin in Thibet, says the Coast Seamen's Journal, is described as enormous in extent, but so shallow that to navigate it one must wade half a mile to reach the boat, and must drag the boat half a mile before it can be floated with a load. But the most remarkable characteristic is the almost incredible amount of salt. Boats and oars quickly become as white as chalk; even the dress of the rowers soon become whitened, while drops of water sprinkled upon a dry surface leave globules like candle drippings.

"'Trans' means 'across,'" said the teacher. "Can anybody illustrate its use?" "Yes'm," answered the pupil in the last row. "'Transparent,' a cross father."

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SPECIAL.

FOR SALE—One 1-1 H. P. motor. One 1-8 H. P. dynamo. Photos for stamp. Roy A. Crihfield, Lincoln, Ill.

FOR SALE—Job lot new electrical goods given us to sell; list for stamp. We handle everything electrical and at lowest prices. Stamp for catalogue. Dept. N., T. Binford Electric Works, 904 Washington Blvd., Chicago, Ill.

ENGINEERS, FIREMEN, MACHINISTS and Electricians send for 40-page pamphlet containing Questions asked by Examining Board of Engineers to obtain Engineers' license. Address Geo. A. Zeller, Publisher, room 592 18 S. 4th St., St. Louis, Mo.

BUSINESS CHANCES.

FOR SALE—Hoisting engines of every description. Portable and Stationary Engines and Boilers—all sizes—for very low prices. Prompt delivery. J. H. Houghton, 77 Oliver St., Boston, Mass.

FOR SALE AT A BARGAIN.—One 85 H. P. Dick & Church engine, size 12x12; 280 R. P. M. automatic governor, and self-contained. In excellent condition. Address Hopkinsville Gas and Lighting Co., Hopkinsville, Ky.

FOR SALE—Two second-hand Worthington Hydraulic Steam Pumps, in first-class repair; size, one pump, 29x24x6, duplex; other, compound duplex, 18x29x24x6; f. o. b. cars at one-third cost new. Cullen & Stock Mfg. Co., 2d and Carr Sts., St. Louis, Mo.

FOR SALE OR EXCHANGE—122 acres all plow land in McHenry county; well fenced; good well and windmill; price $50 per acre. Address 400, Popular Mechanics.

OKLAHOMA 150-barrel flour mill and three elevators, all nearly new, on Rock Island Railroad in center of wheat belt. The best of locations. Will sell at a bargain. Address A. E. Stephenson, Enid, Okla.

FOR SALE—Locomobile runabout, nearly new, $400. Address 402 Popular Mechanics.

WANTED—8-foot Robinson or Keene cornice brake. Geo. E. Roesch, Aurora, Ill.

WANTED—To buy a good second-hand engine, modern type, of not less than 150 nor more than 200-horse power. The Rood Lumber Company, Columbus, Ohio.

WANTED—Six second-hand round reels, one horizontal bran duster, one centrifugal reel. All suitable for 50-barrel mill. J. M. Mattingly, Hartford, Ky.

WANTED—Second-hand bran duster and 50 or 60 horse-power steam feed pump. Sam Howard, Howardstown, Ky.

FOR SALE—9 greenhouses, well stocked, 2 sectional steam boilers, potting sheds, etc., all nearly new; dwelling house, barn, out buildings, 8 acres land, endless water supply, 1 hour from New York City; $8,000. Christie, Florist, Somerville, New Jersey.

HELP WANTED.

GOVERNMENT POSITIONS—Where they are and how obtained. Full particulars as to salaries, dates, places of examinations to be held soon in every state, etc., mailed free. Write for circular 123. Nat'l Cor. Inst., Washington, D. C.

DENTISTS—Two good dentists; must be all around men and rapid workmen; $20 per week to start. New York Dental Co., 74½ Riverside ave., Spokane, Wash.

MEXICO.—Wanted salesman to represent us in the States to sell our line of Mexican drawn work to the dry goods and notion trade. Charles Mandeb, Jr., Monterey, N. L., Mexico.

WANTED—Agents and salesmen; salary and expenses to hustlers; answer at once. Southern Contracting Co., Lake City, Fla.

Attractions for Next Week.

We believe this is the most civilized and progressive age the world has ever known. But is this belief well founded? Many now say that there was once a civilization on our very continent far surpassing anything ever dreamed of at present. Discoveries of ancient irrigation ditches lead to this belief. Read about it in Popular Mechanics next week.—Maybe you smoke a pipe which you think is a genuine meerschaum or briar root but the probabilities are that it is not. Not one-twentieth of them are real. Next week's issue will tell about it.—Not long ago the City of Manila was saved by American firemen. You will be amused when you read of the slothful methods of the Filipino firemen.—If all the coal deep down in the earth and that which has been taken from the earth were made into one big fire that fire would be cold in comparison to the enormous heat of the center of the earth. Scientists are talking of using this heat for power. See Popular Mechanics next week.—Not long ago a Chicago woman paid more than $500 for parlor car berths for her six little dogs.—Did you know that people used to skate by tying bones to their feet?—A 5-acre farm in California with all its buildings, men, women and children inhabitants is sliding down a hill toward a river.—A German has devised a scheme to drive eagles to an airship.—Soon people will be making bread out of pea flour.—Several "shop kinks" of practical value to mechanics and machinists.—A boat that has been under water 2,000 years has been dug up in Ireland.

These and many other interesting things are in next week's Popular Mechanics. It is a peculiar kind of journal, being unlike any other published.

WANTED FOR U. S. ARMY—Able-bodied, unmarried men between ages of 21 and 35; citizens of United States of good character and temperate habits, who can speak, read and write English. For information apply in person or by letter to recruiting officer, 194 S. Clark St., Chicago, Ill., or 16 Vermillion St., Danville, Ill.

IRON WORKERS WANTED (Arichitectural)—Experienced men; accustomed to fitting, etc. Wisconsin Iron and Wire Works, 186 E. Water St., Milwaukee, Wis.

MACHINISTS—Steady work for those who can earn good wages; state experience, etc. Address Submerged Electric Motor Co., Menomonie, Wis.

FINISHER WANTED—One good, all-round man for parlor-suit frames; must understand mixing stains and fillers; steady position to sober man. Penn Parlor Mfg. Co., 960 Liberty St., Pittsburg, Pa.

BUSINESS CHANCES.

WANTED TO BUY LARGER PLANT—Prefer one now in use, 250 volt dynamo of 1,500 to 1,800 light capacity with motor balancer preferred; also moderate speed four-valve engine; also boiler of about 125 H. P. Grimes Bros. Electric Light & Phone Co., Great Bend, Kan.

WANTED—Young man to assist in greenhouses. State wages. M. Ullenbruch, Port Huron, Mich.

WANTED—Tailor (ladies'); first-class man. Address Pettis Dry Goods Company, Indianapolis, Ind.

WANTED—Cabinet makers to work on store fixtures. A. Gutmann & Co., 149 E. Chicago av., Chicago, Ill.

NEWSDEALERS
SUPPLIED WITH THIS PAPER BY AMERICAN AND WESTERN NEWS CO.'S BRANCHES

POSITIONS WANTED.

SITUATION WANTED—Engineer, 12 years' experience and well recommended. M. Shirts, 673 S. Talman ave., Chicago.

WANTED—If you are looking for a competent miller, one who understands the business, with years of experience, address J. B. Lindsay, Shelbina, Mo.

PACIFIC COAST—Situation wanted by experienced specialty salesman, to work Pacific coast states; ten years' experience with jobbing and retail grocers there; salary and expenses. Energy, 1002 North 19th St., St. Joseph, Mo.

SITUATION WANTED—Printer; all-round newspaper and job compositor; state wages paid. Chas. Meyers, Berrien Springs, Mich.

SITUATION WANTED—Repair man, steamfitting machinist and electrical work; best references; reasonable wages. G. B., 6447 Parnell av., Chicago, Ill.

HARNESSMAKER—Good, single preferred, for all-around work; at once. H. Becker & Son, Polo, Ill.

TINSMITH, first-class, having twelve years' experience in cornice and furnace work, also able to estimate on all styles of work; country town in Central States preferred. "P. A. C.," care Columbian Novelty Company, 921 Franklin avenue, St. Louis, Mo.

ASSAYER AND CHEMIST—A graduate of the Colorado School of Mines, with eight years' constant practice at ore-sampling and chlorination plants in Colorado. C. M. P., Salt Lake City, Utah.

CUBA—I will locate in Havana this year and want a general representation for machinery, tools and hardware specialties; well acquainted with languages and customs; references; bond if necessary. C. S. Lawrence, Box 814, New Orleans, La.

UNDERTAKER—Young single man of five years' experience in the furniture and undertaking business. Will furnish any state license. Address Fred L. Griswold, Delton, Mich.